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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/567,546	12/05/2006	Ammar Lecheheb	17307US01	6641
23446 7590 05/20/2009 MCANDREWS HELD & MALLOY, LTD 500 WEST MADISON STREET SUITE 3400 CHICAGO, IL 60661			EXAMINER FIDLER, SHELBY LEE	
			ART UNIT 2861	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/567,546

Applicant(s)

LECHEHEB, AMMAR

Examiner

SHELBY FIDLER

Art Unit

2861

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 March 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 13-30 is/are pending in the application.
- 4a) Of the above claim(s) 13-16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 17-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 3/18/2009 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-8508)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____
- Paper No(s)/Mail Date _____

DETAILED ACTION

Responsive Office Action

This Office Action is responsive to Applicant's remarks and amendments filed 3/18/2009.

Drawings

The drawings were received on 3/18/2009. These drawings are acceptable.

Specification

Amendments to the specification (title) were received on 3/18/2009. These amendments are acceptable.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 17, 18, 21, and 26 are rejected under 35 U.S.C. 102(b) as being anticipated by Nakata et al. (US 6331050 B1).

Regarding claim 17:

Nakata et al. disclose a print head comprising:

one or more print elements (heat generating elements 2), the print elements comprising ink jet valves (col. 9, line 64 – col. 10, line 51 & Figs. 2);

a storage reservoir (chamber 17) for holding a temperature control medium that is also a print medium (col. 17, lines 60-65), the storage reservoir being in fluid communication with the one or more print elements such that, during printing, the temperature control medium can circulate from the storage reservoir to the one or more print elements and then back to the reservoir (Fig. 17); and

a temperature control means (pump 111b) for regulating the temperature of the temperature control medium that flows from the reservoir to the print elements so as to regulate the temperature of the print head (col. 17, lines 60-67 & Fig. 17).

Regarding claim 18:

Nakata et al. disclose all the limitations of claim 17, and also that the print head comprises:

a first conduit (path 114) connected to provide fluid communication from the storage reservoir to the printing elements (Fig. 17); and

a second conduit (path 115) for providing fluid communication from the printing elements to the storage reservoir (Fig. 17).

Regarding claim 21:

Nakata et al. disclose all the limitations of claim 17, and also that the temperature control means (111b) regulates the temperature of the temperature control medium in the reservoir (col. 17, lines 60-67).

Regarding claim 26:

Nakata et al. disclose all the limitations of claim 17, and also that the print head is incorporated into a drop-on-demand printer (Fig. 35).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakata et al. (US 6331050 B1) in view of Hirosawa et al. (US 5220345).

Regarding claim 19:

Nakata et al. disclose all the limitations of claim 18, **but do not expressly disclose** that the print head also comprises temperature sensors in the first and second fluid conduits.

However, Hirosawa et al. teach that it is advantageous to arrange a first temperature sensor (sensor 8A) to sense the temperature in an ink supply conduit, and to arrange a second temperature sensor (sensor 8B) to sense the temperature in an ink return conduit (col. 4, lines 26-36 & Fig. 2), since doing so allows for control of the ink flow to establish uniform temperature distribution in the recording head (col. 5, lines 34-39).

Therefore, at the time of invention, it would have been obvious to a person of ordinary skill in the art to modify Nakata et al.'s print head to include temperature sensors into the ink conduits, such as suggested by Hirokawa et al.

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakata et al. (US 6331050 B1) in view of Kao et al. (US 6634731 B2).

Regarding claim 20:

Nakata et al. disclose all the limitations of claim 17, **but do not expressly disclose** that the print head also comprises a temperature sensor arranged to measure the temperature of the print elements.

However, Kao et al. teach that, by utilizing temperature sensors (temperature sensor 410) next to each print element (Fig. 4), one is able to increase the quality of printing via selective control of the print elements (heating device 450) based on the temperature information (col. 9, lines 40-52).

Therefore, at the time of invention, it would have been obvious to a person of ordinary skill in the art to modify Nakata et al.'s print head to include temperature sensors arranged to measure the temperature of the print elements, such as suggested by Kao et al.

Claims 17 and 22-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hornsneil et al. (WO 03/033951 A1) in view of Nakata et al. (US 6331050 B1) and Hirokawa et al. (US 5220345).

Regarding claims 17, 22, and 24:

Hornsnell et al. disclose a print head (print head 24) comprising:

one or more print elements (valves 610), wherein the print elements are arranged in a two-dimensional array (Fig. 13) and comprise ink jet valves (page 45, lines 21-31);

wherein a storage reservoir, holding a temperature control medium (ink), is in fluid communication with the one or more print elements (page 45, lines 21-31); and

a controller (computer 20) adapted to sense temperatures (page 48, lines 5-14).

Hornsnell et al. do not expressly disclose that the print head comprises:

a storage reservoir, which holds a temperature control medium that also is a print medium, the storage reservoir being in fluid communication with the one or more print elements such that, during printing, the temperature control medium can circulate from the storage reservoir to the one or more print elements and then back to the reservoir;

a first temperature sensor arranged to measure the temperature of the temperature control medium that is communicated from the reservoir to the print elements;

a second temperature sensor arranged to measure the temperature of one of the print head and the temperature control medium that is returned from the print elements;
or

a temperature controller coupled to the first temperature sensor and to the reservoir, the temperature controller being adapted to sense the temperatures measured by the first temperature sensor and to regulate the temperature of the

temperature control medium in the reservoir in response to the measured temperatures so as to regulate the temperature of the print head.

However, Nakata et al. disclose a print head comprising:

a storage reservoir (circulation passage 110) for holding a temperature control medium that also is a print medium (col. 16, lines 22-26), the storage reservoir being in fluid communication with one or more print elements (heat generating elements 2) such that, during printing, the temperature control medium can circulate from the storage reservoir to the one or more print elements and then back to the reservoir (Fig. 18);

a second temperature sensor arranged to measure the temperature of one of the print elements and the temperature control medium that is returned from the print elements (col. 18, lines 65-67);

a temperature controller (CPU 302) coupled to the first temperature sensor and to the reservoir (inherent to col. 18, lines 65-67), the temperature controller being adapted to sense the temperatures measured by the first temperature sensor and to regulate the temperature of the temperature control medium in the reservoir in response to the measured temperatures so as to regulate the temperature of the print head (col. 29, lines 29-32 & col. 18, lines 32-43).

Therefore, at the time of invention, it would have been obvious to a person of ordinary skill in the art to modify the construction of Hornsnell et al.'s print head so as to perform the temperature controls disclosed by Nakata et al. Motivation for doing so, as provided by Nakata et al., is to achieve a good state of liquid ink for stable recording (col. 31, lines 15-17).

Hornsnell et al.'s modified print head does not expressly comprise a first temperature sensor that is arranged to measure the temperature of the temperature control medium that is communicated from the reservoir to the print elements.

However, Hiroswawa et al. teach that it is advantageous to arrange temperature sensors (sensors 8A, 8B) to measure the temperature of ink that is communicated between a reservoir and print elements (col. 4, lines 26-36 & Fig. 2), since doing so allows for control of the ink flow to establish uniform temperature distribution in the recording head (col. 5, lines 34-39).

Therefore, at the time of invention, it would have been obvious to a person of ordinary skill in the art to include temperature sensors into the ink conduits of Nakata et al.'s modified print head, such as suggested by Hiroswawa et al.

Regarding claim 23:

Hornsnell et al.'s modified print head comprises all the limitations of claim 22, and **Hornsnell et al. also discloses** that the temperature control medium is ink (page 47, lines 11-15).

Regarding claims 25 and 28:

Hornsnell et al.'s modified print head comprises all the limitations of claims 17/22, and **Hornsnell also discloses** that the ink jet valves (610) comprise electromagnetic valves (Fig. 1).

Regarding claims 26 and 29:

Hornsnell et al.'s modified print head comprises all the limitations of claims 17/22, and **Hornsnell et al. also disclose** that the print head is incorporated into a drop-on-demand printer (Fig. 8).

Regarding claims 27 and 30:

Hornsnell et al.'s modified printer comprises all the limitations of claims 26/29, and **Hornsnell et al. also disclose** that that printer operates at speeds in excess of 1 kHz (page 45, lines 14-19).

Response to Arguments

Applicant's arguments filed 3/18/2009 concerning claims 17-21 and 26 have been fully considered but they are not persuasive.

Applicant contends that Nakata does not disclose a print head comprising ink jet valves. Specifically, Applicant states that Nakata's heat generating elements are not ink jet valves. Examiner respectfully disagrees. A valve is simply a device that allows/prohibits the flow of fluid through a region. In Nakata's print head, the flow of ink through the nozzles is impeded by the meniscus forces acting on the ink at the nozzle. However, upon actuation of the bubble generators, these forces are overcome to allow the flow of ink through the nozzles. Therefore, Nakata's heat generating elements do constitute a form of ink jet valves.

Applicant also contends that none of the previously cited references disclose a drop-on-demand printer. However, each of the previously cited references discloses a drop-on-demand printer, as is evident by the teachings of individual droplet control.

Applicant's arguments with respect to claims 22-30 have been considered but are moot in view of the new ground(s) of rejection. However, please see the rejection based on the disclosures provided by Hornsnell et al., Nakata et al., and Hirose. This combination of teachings shows that it was obvious to a person of ordinary skill in the art to produce a drop-on-demand printer having a temperature controlled print head that uses a plurality of rows of electromagnetic ink jet valves as its actuating members.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Communication with the USPTO

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SHELBY FIDLER whose telephone number is (571)272-8455. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Luu can be reached on (571) 272-7663. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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